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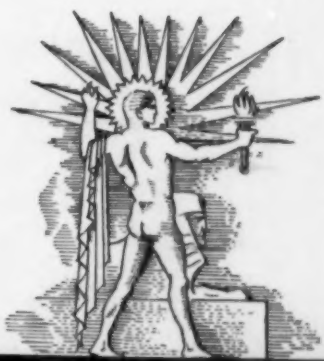
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



SEPTEMBER 26, 1931

Sewing Metal Seams With a Flash

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SCIENCE NEWS LETTER

VOL. XX *No. 546*

The Weekly Summary of Current Science

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Edited by WATSON DAVIS

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DO YOU KNOW THAT

A new variety of oats, known as Franklin Oats, has made record yields in tests in Ohio.

In earlier ages, America included camels among its animals, and today it still has members of the camel family in South America: the llama, alpaca, guanaco, and vicuna.

In Europe and Asia, reindeer have been domestic animals of the Arctic for many centuries, but in Alaska the Eskimos had no tame reindeer until recent times.

The vegetable weevil, a new flying insect which eats most of the common garden crops, is spreading in the southern states and has appeared in California, the U. S. Department of Agriculture has reported.

Mummies of dogs that were pets of Indians 2,000 years ago have been found during excavations in the Southwest.

Brilliant sunsets that last all night may be observed in the Antarctic before the polar night sets in.

Indians of prehistoric America had almost as many ways of cooking corn as we have today.

A new strain of popcorn has been produced, which pops to a surprising size.

Polar bears are sometimes mistakenly called albinos, but they do not have the pink eyes of animals which are lacking in pigment.

Statistical studies in Illinois indicate that women live, on the average, two years longer than men, yet women have more physical defects and get sick oftener.

A dairy expert who has made tests with ice cream for more than two years states that ice cream has a smoother texture when rapidly frozen.

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Science Service presents over the radio, an address

SOME RECENT ADVANCES IN MEDICINE AND PUBLIC HEALTH

By Dr. G W. McCoy, director of the National Institute of Health, Washington, D C.

Friday, October 2, at 2:45 P. M., Eastern Stndard Time

Over Stations of

The Columbia Broadcasting System

METALLURGY

Faraday's Research on Metals Anticipated Modern Steel

Scientist's Pioneering in Metallurgy Revealed From Analyses of Specimens Found During Summer

MICHAEL FARADAY was a pioneer of modern alloy steel, and his metallurgical researches 107 years ago "anticipated in a remarkable manner the facts and principles on which the present enormous development of alloy steel is based." Sir Robert Hadfield, himself the father of modern alloy steel, revealed at the Faraday Centennary Celebration held in London this week, analyses of 79 small specimens of steel and alloys, discovered during the rebuilding of the Royal Institution this summer, in a small box labeled in Faraday's own handwriting.

This forgotten cache, examined by modern metallurgical methods, shows that Faraday alloyed thirteen metallic elements, and also carbon, silicon and sulphur, with iron, using a forced-draft furnace capable of high heat. By adding chromium and nickel, Faraday anticipated present post-world-war developments of stainless steel. Using the noble metals—gold, iridium, osmium, palladium, platinum, rhodium and silver—Faraday surpassed present-day technical development.

Small knives, made from a piece of Faraday's original high-platinum steel, were presented to the president of the British Association for the Advancement of Science, Gen. Jan Christian Smuts, and to a few other scientists attending the celebration.

Sir Robert Hadfield's study into Faraday's alloys required nearly five hundred chemical analyses, utilizing, however, less than half a pound of the priceless relics. A full report of the work will soon appear as a large book.

Discovery of Faraday's metallurgical pioneering heaps new honors on his memory, while he is memorialized for the hundredth anniversary of his epochal magnetic induction experiment, fundamental to the electrical industry.

Prof. Elihu Thomson, American electrical pioneer, credited Faraday with the invention of the transformer, which makes power transmission possible. Lord Rutherford hailed his fundamental research on electrolysis. Sir William Bragg called attention to his discovery of benzene, which is fundamental to all modern organic and physiological chemistry and to the chemical industries depending on these sciences. Prof. Peter Debye of Leipzig, told how he recognized the identity of chemical affinity and electricity. Prof. P. Zeeman of Amsterdam credited the great English pioneer with demonstrating the effect of magnetism on light, fundamental to modern physics, and the Marchese Marconi told how he planted the seed whence wireless has sprung. The Duc de Broglie, of Paris, paid tribute to his laying of the foundation of modern physics, and Prime Minister Ramsay Macdonald related his contributions to the welfare of the British Empire.

Faraday, in making alloy steel, was far ahead of his time. Although his alloys were made at Sheffield on a comparatively large scale, into cutlery, razors, fireplace fenders, etc., lack of industrial demand turned Faraday to electrical investigations which are fundamental to industry today.

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BOTANY

Tiny Cellulose Balls May Be Smallest Plant Units

LITTLE CELLULOSE spindles are no longer the smallest known units which make up the structure of a plant; spherical bodies, tinier still, have been discovered. These minute spheres, observed for the first time at the U. S. Forest Products Laboratory, Madison, Wis., measure about one fifty-thousandth of an inch in diameter. They were found through microscopic examination in the spindles which are larger structural units of the plant fiber.

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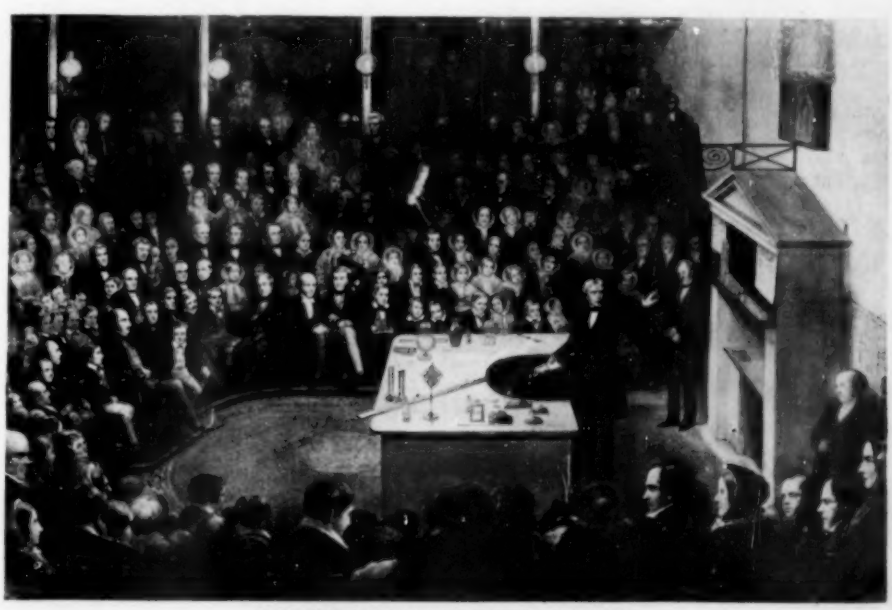
ARCHAEOLOGY

Indian Writing Moved From Bottom of Future Lake

WHEN the waters of the huge Safe Harbor hydro-electric dam cover islands in the Susquehanna River at Safe Harbor, Pa., to a depth of 40 feet, archaeologists will have no cause for regret. For the objects which made these islands archaeologically valuable—picture writing chiseled in the surface of the rock—have been carefully removed, cut out of solid rock in huge chunks with compressed air drills, to be saved for future study.

The work of removal has been going



DESCRIBING HIS DISCOVERIES

Michael Faraday lecturing before the Royal Institution, December 1855. A reproduction of the original painting by Alexander Blaikley.

PICTURE WRITING

And the method of its removal from the bottom of a future lake for study. The watch indicates the comparative size of the symbols.

on for a year and a half during which time 65 groups of ancient rock writings have been taken from the river. Many of the rocks weighed hundreds of pounds and had to be chiseled away above dangerous rapids.

More than 300 complete pottery vessels and many other objects were also taken from the area of the rock writing. Valuable archaeological data were collected and many charts, and molds of the picture writing were made.

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METALLURGY

Ultra-Violet Light and High Frequency Current Harden Steel

Use, Other Than in Dentistry, of Some 8,000,000 Precious Alloys, Also Urged Before Steel Treating Society

HARDENING the small metal parts of typewriters, sewing machines, and the like may be speeded up by the use of high-frequency radio currents, ultraviolet light, and the electric spark, according to a report presented by John J. Egan, research metallurgist of Long Island City, N. Y., before the American Society for Steel Treating, in Boston.

The steel is given this desired "case hardening" by nitriding, Mr. Egan explained. This previously has been a slow process, involving the heating of the steel while it is placed in a nitrogen atmosphere. After many hours of heating in contact with the nitrogen gas, it is cooled and its surface or "case" has become hardened.

But by subjecting the metal to ultraviolet light or to electrostatic fields caused by the electric spark or high-frequency radio currents, nitriding is speeded up and hard satisfactory cases are made in a short time, he reported. While Mr. Egan does not believe these methods to be commercially applicable at the present time, he thinks that further experimentation should make them so.

Alloys of precious metals should prove useful in other fields than dentistry, the society was told by Prof. R. C. Brumfield, of Cooper Union, New York City.

Gold, silver, platinum, palladium, and other rare elements, when alloyed with the baser metals, have service qualities that can be known only by actual experimentation, according to Prof. Brumfield. It is estimated that eight million combinations are possible, each with its unique characteristics. Only a few of them have ever been developed, and these have been used in dentistry. The resistance of these alloys to discoloration and their possibilities for heat treatment recommend their use elsewhere, Prof. Brumfield said. The ultimate strength of some of these metals is as much as 90 tons per square inch. The strength of steel ranges from 50 to 100 tons per square inch.

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ECONOMIC ZOOLOGY

Eugenie Hats Demand Feathers; Ostrich Breeding is Revived

EMPRESS EUGENIE hats, and other feather-decorated feminine headgear now sweeping into fashion, have resulted in a sudden revival of the ostrich-breeding industry that had all but died out in South Africa.

So low had the industry fallen that there are now only about 13,000 birds in this district, and with breeding going on at a capacity rate it is estimated that it will take at least two and one-half years to bring the number up to 50,000, and at least fifteen years to reach the pre-war total, which was 300,000 birds.

Before the present boom six-month-old ostrich chicks sold for about $5, but today there are few for sale at any price; some ordinary flock birds are selling for $20 each, while breeding birds bring as high as $75 a pair. Incubators that have been idle for years are being repaired to receive batches of eggs.

So badly had the ostrich feather industry fallen off that only seventy sorters of feathers could be mustered.

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ARCHAEOLOGY

American Archaeologists Make Finds in Italy

THE FIRST non-Italian expedition to be granted permission to do archaeological excavating in Italy reports great success after less than one month's work. Dr. Jotham Johnson, field director of the University of Pennsylvania Museum's expedition to Minturno, Italy, reports to Horace H. F. Jayne, director of the Museum, the discovery of a remarkable series of architectural terra cottas dating from the third to first centuries B. C., as well as a fine sculptured head of the Emperor Tiberius and a statue of the Emperor Augustus.

No less than eighty inscriptions have also been found, but for the most part these were built into walls of a later temple, and have not yet been read. A late mosaic landscape of the Nile has also been unearthed by Dr. Johnson.

This "dig" at Minturno marks the first time in history that a foreign institution has been permitted to work in the Italian field, and permission was due

to the efforts and kindness of Count Constantini, and the hearty cooperation of Dr. Amedeo Maiuri of the Naples Museum, officials of the University of Pennsylvania Museum announce.

Minturno itself is a highly interesting site, and dates from pre-Roman times when it was known as Minturnae. It lies about forty miles northwest of Naples on the Mediterranean Sea. Formerly it was the ancient city of Aurunci and in 314 B. C. it was one of three towns to make war against Rome.

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METALLURGY

Flash Welding Joins Metal Amid Shower of Sparks

See Front Cover

A BRILLIANT shower of sparks for a few seconds, and two pieces of steel have become one, with a union as strong as the original metal itself.

The picture on the front cover from the Pittsfield, Mass., works of the General Electric Company illustrates a recent adaptation of electric welding to industry. It is joining together the sides of the open seam of a cylindrical casing for a small transformer. As the edges to be welded slowly near each other and as the minute projections come into contact first in one place and then in another, there is a spectacular flashing and a huge shower of sparks is thrown high into the air. The edges of metal redden and become plastic with heat.

The two edges of metal join; good contact is made; and a huge current, from 100,000 to 200,000 amperes, rushes through the new joint. It is quickly shut off. In but six seconds the adjoining edges of a rolled sheet have become as the sheet itself. No metal other than that of the steel plate has been used.

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MEDICINE

Six Generations of Poliomyelitis Virus Grown Outside Body

Successful Laboratory Cultivation Expected to be Valuable in Learning to Control Disease

THE ORGANISM causing infantile paralysis has been successfully grown outside of the human body at the Mt. Zion Hospital, San Francisco, Dr. Frederick Eberson, director of clinical laboratories and research at the hospital and assistant clinical professor of medicine at the University of California, has just announced. The significance of this announcement lies in the fact that the virus or germ of infantile paralysis has never before been successfully cultivated outside the body and investigations leading to control of the disease have been consequently hampered.

The studies at the Mt. Zion laboratories have been made during the past year with a special culture medium prepared from brain tissue. It is on this medium that the virus has been grown.

Numerous attempts to grow this virus have been made previously, and several apparent successes have been reported. Scientists generally, however, have not been satisfied that cultivation of the virus has actually been accomplished in any of these cases.

How the germ was successfully grown is described in detail in a special communication to Science Service by Dr. Eberson. Because the germ prefers to attack nervous system tissue, brain, which is part of the nervous system, was used. Tissue from sheep and human brains was used, and in such material six generations of the virus have been grown up to the present time.

Success with brain tissue in cultivating the germ of another disease which attacks the nervous system led to experiments with the same culture media for infantile paralysis virus.

"The original virus was diluted a million or more times, which excluded the mechanical carrying over of the virus itself and proved the actual growth of the living culture," Dr. Eberson said.

Virus from the spinal cord of a monkey afflicted with infantile paralysis provided the original material for the research. After from eight to ten days of growth on the special medium of brain tissue, tiny minute organisms could be seen when a bit of the culture was put on a slide, stained and viewed through a microscope.

Controls Negative

This material was transplanted to new culture media and a new generation of the virus grew up. This has been continued for six generations so far.

"Controls with the culture media alone were always negative," Dr. Eberson said. "The original virus filtrate was negative for all organisms. The visible virus cultures failed to grow in all ordinary culture media."

Actual multiplication of the virus can be demonstrated, he reported.

"The organism has three stages of growth. One stage is invisible under the microscope although the culture medium is cloudy. Other stages are seen as larger globular bodies with pale centers and later as clusters of minute ovoid bodies about one-fifth the size of ordinary small cocci. The virus bodies appear to have a surrounding envelope that favors adhesion of the organisms to form peculiar nests of colonies."

Studies of the behavior of this artificially-grown virus in the bodies of monkeys is now being made. Studies on immunization and serum production are also under way, Dr. Eberson reported.

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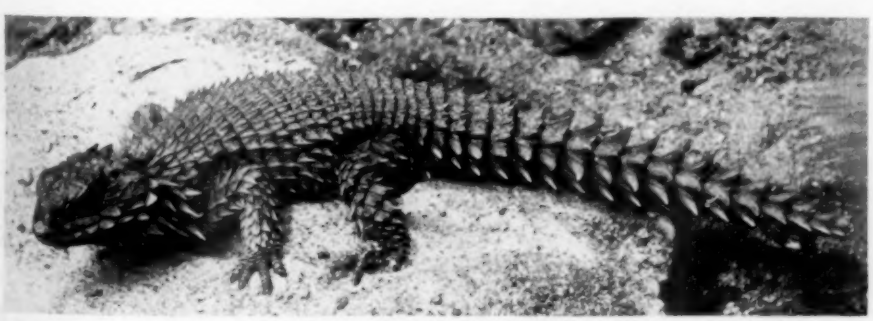

IN AN ARMOR OF SPINES

This African Spike-Tailed Lizard parades on his desert rock. In a barren and hungry land, where everybody is hunting for something to eat, it behooves potential mouthfuls to make themselves just as difficult as possible.

PSYCHOLOGY

Likes and Dislikes Signalled By Babies' Feeding Behavior

THE NEW-BORN infant can tell the psychologist about what he is able to taste and feel. So Dr. Kai Jensen of the Connecticut Agricultural College, reported to the meeting of the American Psychological Association in Toronto.

The language used by the infants studied by Dr. Jensen was the pressure of their sucks on a nursing bottle as recorded on a complicated apparatus which he designed especially for this purpose. When milk of the correct temperature is in the bottle, the infant will suck and then swallow rhythmically and with equal pressure. But let the temperature be raised or lowered enough and he will suck much less vigorously, with increasing irregularity, until he stops altogether. The temperature acceptable varies greatly with different infants. Some will take it as cold as ten degrees Fahrenheit above freezing point. Some will drink milk as hot as 150 degrees, although the usual temperature for feeding is about 105 degrees. Differences in temperature of less than two degrees are detected by the infants.

To test the sense of taste, salt solutions were given. The weakest solution tasted by the babies was only 225 thousandths of one per cent. and differences as minute as 25 thousandths of a per cent. were noticed. The infants studied were all under twelve days old.

Putting a human baby through a test designed for testing a monkey, giving no directions, but using food for "bait," was one of the steps of a series of experiments described at the meeting by Dr. Louis W. Gellermann of Yale University. The whole series conducted by Dr. Gellermann and Dr. Walter S. Hunter involved tests of many types of animals from rats to human adults. They demonstrate a clear difference between the typically human ability of the symbolic type and ability of the ordinary habit-formation type.

The apparatus used in the baby-monkey test consisted of two boxes in which food was placed as rapidly as it was taken out by the infant or animal. Each box had a lock which could be operated by the person giving the test. This he did in such a way that the boxes could be opened only in a particular order, first the right one, second right again, third left, fourth left; continuing thus twice right, twice left.

Dr. Gellermann found that two separate abilities are involved in the task of learning this pattern without any direction or encouragement other than the urge of hunger. The simple trick of learning to look in the right box first for food is one which the lower animals learn more readily than does the human infant, but the tendency to turn first to the right and then to the left, and the ability to discover the pattern of two right and two left, is highest in human beings and less in evidence going down the evolutionary scale. Roughly, the order for the animals tested seemed to be highest for human adults, next children, then at about an equal level human infants and adult chimpanzees, then Rhesus monkeys, raccoons and last rats.

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ICHTHYOLOGY

Fish Use Their Ears To Maintain Balance

NEW EVIDENCE that fish, like higher animals, use their ears for maintaining balance as well as for hearing was recently advanced by Prof. Karl von Frisch in an address before the Bavarian Academy of Sciences.

Prof. von Frisch noticed during his first experiments that the fish reacted to whistling alone. Later, methodically carried out experiments showed not only an almost human sense of hearing, but also a pronounced acuteness of hearing and a capacity for distinguishing tones.

To detect whether this was really hearing and not merely a highly developed sense of touch, certain parts of the inner ear of fish were removed. It was found that the inner ear served partly to maintain equilibrium and partly for hearing. If the lower part of the ear labyrinth was removed the fish became deaf; if the upper part was removed, the sense of hearing remained but equilibrium was disturbed.

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BOTANY

Textiles May Come From Equadorian "Silk Flower"

A TALL BUSH with bright yellow and red flowers, bearing long silky fibers in its pods, may be the source of new textiles, in the opinion of Dr. A. Avila of Guayaquil, Equador, who has been investigating its properties.

It grows in the tropical forests of the Equadorian mountains, where it is known to the natives as the "silk flower." It belongs to the euphorbia or spurge family, being related to such well-known plants as the Para rubber tree, the castor bean, and the poinsettias used in Christmas decorations.

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ENGINEERING

Metal, Though Good Conductor Now Insulates Against Heat

METAL, ordinarily thought of as a high conductor, is being used to stop heat. This new type of insulation, using aluminum foil as a basis, has been demonstrated as superior to the old methods and finds a wide application. So Max Breitung says in a report to the American Society of Refrigerating Engineers.

For insulation purposes, sheets of aluminum as little as .0003 of an inch thick are crumpled irregularly and assembled in layers. The limited area of contact allows a very small transfer of heat, and the foil has the advantage of not storing the heat as well as of being light and untarnished by air.

Following research both in German and American laboratories, aluminum foil is being employed in the household, in fish and meat industries, on railroad lines, and as an insulant for both brine and steam pipes on German cruisers. One of the French Merchant Marine vessels now under construction has been fitted with four tons of these sheets.

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GENERAL SCIENCE

Changing Science is Leaving Nothing Solid in Universe

Gen. Smuts, President of B. A. A. S. Says New Relativism Shows That Cosmos Consists Wholly of Events, Not Things

MATERIALISM, the philosophic flower of nineteenth-century "common sense" science, envisaging a solid world ruled by definite and determinable forces, is a falling god. The ground has been literally dissolved from under its feet by the new relativism of the twentieth century, which leaves nothing solid in the universe—which shows the cosmos to consist wholly of events and not of things. Science, floundering at first in this sudden bath of almost metaphysical facts, is beginning to find its feet and make itself at home in the world again.

This, in extreme condensation, is the gist of the presidential address of Gen. the Rt. Hon. J. C. Smuts, P.C., C.H., F.R.S., this year's head of the British Association for the Advancement of Science, delivered before the hundredth annual meeting of that body in London this week. The Boer soldier-statesman-scientist, once the most formidable enemy of the British Empire, but during and since the World War one of the strongest pillars of the British Commonwealth of Nations, summarized the state of science at the end of the last century, and contrasted it with the developing picture of science today.

Closed Picture of Cosmos

At its culmination, Gen. Smuts indicated, the "classic" physics presented a closed picture of the cosmos.

"The atomic view of matter was established. Ether was given a status in the physical order, which is now again being questioned in the light of the conception of space-time. New entities like energy emerged; old entities like forces disappeared; the principle of the uniformity of nature was established; the laws of motion, of conservation, and of electro-magnetism were formulated; and on their basis a closed mechanistic order of nature was constructed, forming a rigid deterministic scheme. Into this scheme it has been difficult, if not impossible, to fit entities like life and mind; and the scientific attitude has on the whole been to put them to a suspense account and to await developments.

"As to the supernatural, science is or has been agnostic, if not frankly sceptical. Such, in very general terms, was the scientific outlook of the nineteenth century, which has not yet completely passed away. It will be noticed that much of the fundamental outlook of commonsense has thus survived, though clarified and purified by a closer accord with facts. This scientific view retained unimpaired and indeed stressed with a new emphasis the things of commonsense, matter, time and space, as well as all material or physical entities which are capable of observation or experimental verification.

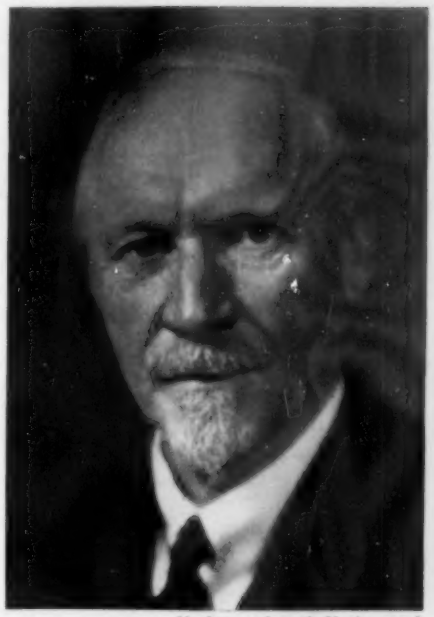
"Nineteenth-century science is, in fact, a system of purified, glorified commonsense. Its deterministic theory certainly gave a shock to the common man's instinctive belief in free will; in most other respects it conformed to the outlook of commonsense. It is true that its practical inventions have produced the most astounding changes in our material civilization, but neither in its methods nor in its world-outlook was there anything really revolutionary."

But even at its fullest fruition, nineteenth-century science contained the seeds of ideas that would undo and supplant it. The work of such men as Faraday, Clerk Maxwell, Thomson and Rutherford paved the way for the concepts and experiments that have resulted in the revolution led by Einstein, De Sitter, Planck and the other makers of a new heaven and a new earth. Under their searching analyses the atom has dissolved into protons and electrons, and electrons now appear to be waves instead of particles—events instead of things. Time and space behave as two aspects of the same continuum, space-time. Light is not a continuous stream of waves, but is broken up into bits, the quanta.

These quanta are especially troublesome for the physicist to deal with, Gen. Smuts said.

"The world in space-time is a continuum; the quantum action is a negation of continuity. Thus arises the contradiction, not only of commonsense, but apparently also of reason itself. The quantum appears to behave like a particle, but a particle out of space or time. As Sir Arthur Eddington graphically puts it: a quantum of light is large enough to fill the lens of a hundred-inch telescope, but it is also small enough to enter an atom. It may spread like a circular wave through the universe, but when it hits its mark, this cosmic wave instantaneously contracts to a point where it strikes with its full and undivided force. Space-time, therefore, does not seem to exist for the quantum, at least not in its lower multiples. Nay, more; the very hitting of its mark presents another strange puzzle, which seems to defy the principles of causation and of the uniformity of nature, and to take us into the realm of chance and probability.

"The significant thing is that this stronge quantum character of the universe is not the result of theory but is an experimental fact well attested from several departments of physics. In spite of the strange Puck-like behaviour of the quantum, we should not lightly conclude, with some prominent physicists, that the universe has a skeleton in its cupboard in the shape of an irrational or chaotic factor. (*Turn to page* 207)



Underwood and Underwood

GENERAL J. C. SMUTS

Boer soldier-statesman-scientist and president of the British Association for the Advancement of Science

PSYCHIATRY

Mental Disease Threatens Many School Children

FOUR out of every hundred school children today will become candidates for mental hospitals unless mental hygiene is applied in the schools, declared Dr. Frederick L. Patry of the New York State Educational Department before the American Association of School Physicians in Montreal with the American Public Health Association.

"The psychiatrist is the newest recruit to public health, particularly as preventive worker or mental hygienist," Dr. Patry said. "The campaign against mental disease is being carried on as extensively and persistently as that against tuberculosis."

Because mental disease is more subtle and its progress slower than physical disease, it is not yet possible to appraise the preventive work being done in the field, but the value of the present work will show up within the next 25 years, Dr. Patry predicted.

Dr. Patry told his audience a number of striking facts which should stimulate redirection of educational methods and practice. For example, a large proportion of incorrigible children are dull or feeble-minded, and the majority of children who fail in school do so because the school program is above their ability. Educators have failed to recognize the relationship between educational problems and failure, he said.

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PUBLIC HEALTH

Drought Increases Intestinal Ills, Cuts Malaria

WHAT did the recent grave drought do to the health of the country? Several things, it appears from reports to the American Public Health Association.

A chief result was an increase in intestinal troubles, Dr. M. P. Ravenel of the University of Missouri told the recent meeting of the Public Health Association. This was especially the case in children under two years of age. Malnutrition was also increased, the Arkansas Public Health officer reporting that it was doubled among rural children.

Missouri, Tennessee, Kentucky and Oklahoma reported marked increase in typhoid fever. In Kentucky the typhoid deaths for the drought period almost all occurred in the counties without health organizations and where little or no immunization was done.

A great and steady increase in pellagra was also noted.

The one bright spot on the health picture in the drought area, Dr. Ravenel said, was the marked decrease in cases of and deaths from malaria. In Tennessee this decrease amounted to almost fifty per cent. in cases and twenty per cent. in deaths.

An outbreak of acute stomach and intestinal trouble which was probably a result of the drought was described by Dr. M. V. Veldee of the U. S. Public Health Service. The outbreak occurred in Charleston, West Virginia, in the fall of 1930, and was followed by similar attacks in at least six Ohio River cities during January, 1931.

The illness lasted from a few hours to three or four days. The water supply was the only factor which these cities had in common and which was not shared with other cities in the vicinity. Examination of the drinking water for microbes showed no deterioration in its sanitary quality.

Dr. Veldee advanced the theory that the cause of the outbreaks was a nonliving irritant which was introduced into the water because of the great decrease in volume of raw water, due to drought, yet without decrease in the amount of wastes discharged into the watercourse.

Science News Letter, September 26, 1931

ZOOLOGY

Moose are Increasing Rapidly in Sweden

INSTEAD of becoming extinct, moose are rapidly increasing in Sweden, thanks to restrictive game laws. During last year's brief open season of three days 5,082 animals were killed, according to official figures. This means an increase of more than 800 over 1929 and 1,360 over 1928. Since each animal is worth about fifty dollars, the total value of the moose killed in 1930 is about 1,036,400 kronor ($277,755).

In spite of this heavy killing, the moose herds in central and northern Sweden increase annually, and in fact cause many farmers actual losses because of the damage they do to crops and young trees. In most parts of the country the moose cows and calves enjoy constant immunity while the open season on bulls lasts but a few days, according to their prevalence in each district.

Science News Letter, September 26, 1931

IN SCIENCE

GENERAL SCIENCE

Highest Honors Given American Scientists

A FEATURE of the Faraday Centenary Celebration in London this week was the announcement of the granting of honorary memberships in the Royal Institution to four noted American scientists. These memberships are among the highest honors which Englishmen can give to foreigners.

The Americans thus honored are Dr. Elihu Thomson, the father of electrical engineering in America; Prof. R. W. Wood of the Johns Hopkins University, known for his researches in many fields of physics but especially in that of physical optics; Prof. Michael I. Pupin of Columbia University, whose discoveries and inventions have made modern telephonic communication possible; and Howard McLenahan, secretary of the Franklin Institute at Philadelphia.

Science News Letter, September 26, 1931

INVENTION

Electrical Instrument Gives Piano or Organ Effects

A NEW electrical musical instrument, using a keyboard and giving musical effects of either piano or organ types, is the invention of Benjamin F. Miessner, radio engineer.

As described by the inventor, the new instrument looks much like a small grand piano. It produces its sounds as a piano does, by striking on strings. But instead of having a sounding-board like a piano, it puts the notes through an electrical translating, amplifying and reproducing apparatus.

It may be played as a piano or as an organ, Mr. Miessner states. A wide range of quality may be obtained in either of these, and in addition there are a number of other interesting musical effects, such as tone-swell after key depression. The new instrument gives dynamic control of tone by the weight of the key touch in its organ as well as in its piano performance, differing therein from regular organs.

Science News Letter, September 26, 1931

NCE FIELDS

PSYCHOLOGY

Way Baby Takes Hold of Ball is Index to His Age

THE WAY in which a baby takes hold of his ball changes as the child grows older, and this change is due not only to the growth and development of the hand, but to control by a different part of the brain, Dr. H. M. Halverson of Yale University has found.

The infant's strong grip on things soon after birth, which is so vigorous as to enable him to sustain his own weight, relaxes as he grows older so that the force of the grip is more in keeping with that needed to hold the weight of the object. At this time he begins to use his thumb in picking things up and to make use of his finger tips to replace the palm in grasping.

During the first few months of life, the human infant is largely a "thalamo-pallidal being," Dr. Halverson said. The thalamus is that part of the brain which controls such vegetative activities of the body as digestion, circulation of the blood, breathing, and involuntary changes in facial expression. Not until he is over a year old does the baby take hold like a man, Dr. Halverson said.

Science News Letter, September 26, 1931

AVIATION

Depression Spurs Making Of Light Airplane

THE PRESENT business depression is a spur to the development of a light, cheap airplane that can be owned by the man of moderate means. This is the view taken by Karl H. White, design engineer, of Robertson, Mo.

"The light airplane is one logical result of the aftermath of an oversold airplane public," Mr. White declared. "The word 'airplane' has been too expensive for the majority of people to consider—not too dangerous or unsafe, but too expensive.

"'Normal powered' airplanes have required engines costing from $1,500 up," he continued. "This in itself, not to consider operating expense, has been sufficient to keep the prices of airplanes out of general reach. The airplane manufacturer has therefore groped around for a means of lowering the cost of some of the new models and has resorted to the low-powered engines costing less than $500 as a good start toward the possibility of producing a real low-priced airplane."

Engineers have much to learn about the design of light airplanes, but many new and interesting models are breaking forth all over the country to give them this needed experience, Mr. White pointed out. These planes are being built to meet three requirements which Mr. White gives in order of importance as price, safety and appearance.

Science News Letter, September 26, 1931

PUBLIC HEALTH

Health Myths Often Replace True Facts

HEALTH teachers and those engaged in telling health facts to the public should stick to the Grade A facts, advised Dr. Donald B. Armstrong of the Metropolitan Life Insurance Company at the recent meeting of the American Public Health Association in Montreal.

"So-called health facts worth telling should be important and should be true, though truth is relative," Dr. Armstrong said.

"Every period has its health myths," he added. "Current ones include A Clean Tooth Never Decays and the relationship of underweight to tuberculosis in the school child."

Some true Grade A health facts mentioned by Dr. Armstrong are certainties as to the source of infection in some communicable diseases, the value of immunization for prevention of disease, the value of minerals and vitamins in the diet, and the value of sunlight under certain conditions.

More numerous are the Grade B, near facts, which include things that are believed to be true, probably are true, but cannot be proved so at present. Examples are the real value of six glasses of water a day, of eight hours' sleep at night, of fresh air for the prevention of colds, of exercise, a full bath once a week, of teeth brushing, etc. These facts need verification, but telling them to the public probably does some good.

Dr. Armstrong suggested that the American Public Health Association might have an appraisal committee to study and classify the facts used for educational purposes.

Science News Letter, September 26, 1931

METALLURGY

Radium's Gamma Rays Test Electric Welds

RADIUM'S gamma rays have found another use, Dr. Gilbert E. Doan, of Lehigh University, has reported to the American Society for Steel Treating. They make rapid and sure testing of steel welds possible.

While ordinary testing of electrically made joints in steel necessitates breaking the joints, according to Dr. Doan, gamma ray photographs of the joints disclose defects inherent in the welding without fracturing them. Previous use of X-ray and gamma ray photographs of steel castings gave Dr. Doan the idea, he said, of using radium to reveal the flaws of welds. Dr. Doan's experiments showed that his method is adequately sensitive and definitive.

Under the previous process, photographs of the fractures of the welds were insufficient because the coloring as well as the outlines of the fractures was necessary to show if defects had existed. But simple inspection of the gamma ray photographs by one who can interpret them, according to Dr. Doan, reveals all that is needed to know about the steel joints.

Science News Letter, September 26, 1931

ENGINEERING

Makes No Difference Way Ship's Screws Turn

SEAMEN say that a ship maneuvers better with outward- rather than inward-turning screws.

In order to find out whether such belief was anything more than a mere mental attitude, tests have been made on models at the British National Physical Laboratory's tank and supplemented with steering experiments at sea. As a result, it seems in reality that there is hardly any difference at all between the efficiency of the two types of screws.

G. S. Baker, of the National Physical Laboratory, has asserted before the Institute of Marine Engineers that there is only one condition when this conclusion is not quite true. If the screws are given a few revolutions ahead when a ship is against a dock wall, with outward-turning screws there is a reaction from the dock wall that is not present with the inward-turning type, and the slanting off of the ship would be slightly different in the two cases. Away from the wall, this difference is gone.

Science News Letter, September 26, 1931

ASTRONOMY

Harvest Moon Now Flooding Earth With Excess Light

MORE MOONSHINE than usual will be the order for several evenings before and after Saturday, September 26. Ordinarily the moon rises about an hour later each night, but around that date it will rise above the eastern horizon each evening only about 19 minutes later than the previous evening. This is the well-known "harvest moon," the full moon occurring nearest to the autumnal equinox, which comes this year on September 23, and marks the beginning of autumn.

The accompanying diagram shows why this occurs. Because of the daily rotation of the earth, the sun, the moon and all the planets and stars seem to move across the sky from east to west. They rise above the eastern horizon, for a large part of the United States, at an angle of about 50 degrees. However, the moon is also moving among the stars, from west to east. Each night, at moonrise, it is about 12 degrees farther east in the sky than it was the previous night, and therefore its rising is delayed. But the path along which the moon moves through the stars, called the ecliptic, is inclined at an angle of 23½ degrees to the line along which it seems to move as it rises. At the time of the autumnal equinox the ecliptic at moonrise is most nearly parallel with the horizon. The lines a, b and c represent the moon's motion as it rises on September 25, 26 and 27. The more nearly equal these lines are, the less is the time moonrise is retarded from one night to the next.

Retarded in March

In March, however, the path of the moon is much more inclined to the horizon. The lines d, e and f represent the path of the full moon as it rises on successive days in March, about the time of the spring equinox. Then, as now, the moon each night is about 12 degrees farther east among the stars than on the previous night. This motion, however, then carries it the greatest distance below the eastern horizon, and so its rising is retarded by the greatest amount, as much as 80 minutes a day.

The greater number of bright moonlight evenings at this time of year is supposed to help the farmer do his harvesting at night, and that is the origin of the name of "harvest moon." The next full moon after the harvest moon is also characterized by an unusually short daily retardation of rising, and is called the "hunters' moon."

Science News Letter, September 26, 1931

PUBLIC HEALTH

Smallpox Threatens Large Part of Country

LARGE PARTS of the United States are in grave danger of epidemics of that horribly disfiguring and highly fatal disease, smallpox, members of the American Public Health Association have been told by George H. Van Buren of the Metropolitan Life Insurance Company.

The fact that over half a million cases of the dreaded disease occurred in the United States during the period 1920-1930 came as a surprise to this important gathering of public health officials and authorities, in view of the fact that vaccination, sure preventive of smallpox, has been known for 130 years.

"Almost all of these cases occurred in states whose aggregate population is about 70 per cent. of the total for the country," Mr. Van Buren said. "In these states there was one case of smallpox per annum for every 1,500 inhabitants."

The largest number of cases per thousand population was reported from the eight Rocky Mountain and the three Pacific Coast states, while the fewest cases were found in the most densely populated parts of the country, the New England and the Middle Atlantic states.

"These are the states in which public sentiment has been most active in supporting constituted health authorities in measures for the prevention of smallpox," Mr. Van Burean pointed out. "On the other hand, the states where the incidence of the disease is high are those where opposition to compulsory vaccination has been strongest.

"Until there is more general vaccination and revaccination, there will always be grave danger of severe outbreaks."

Science News Letter, September 26, 1931

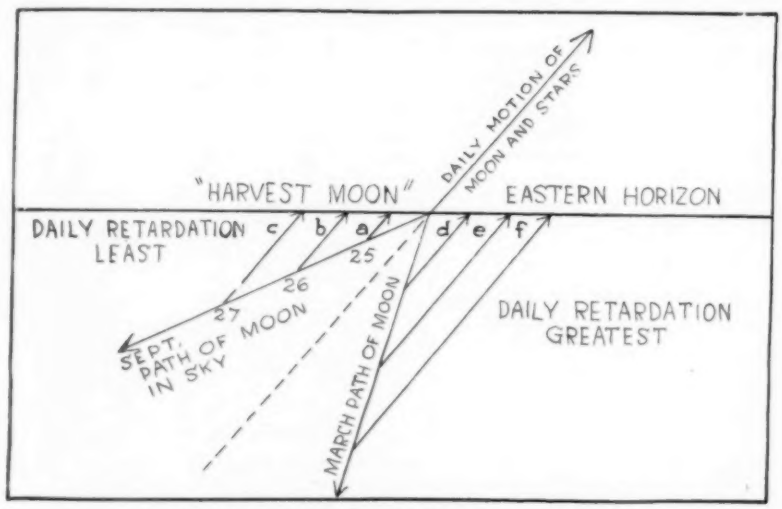
METEOROLOGY

Tropical Hurricanes Once Ancient Maya Disasters

TROPICAL hurricanes, such as those that destroyed Belize and tore across Yucatan, operated in the downfall of the Mayas shortly before the coming of the first white men to the peninsula.

Natives told Diego de Landa, second bishop of Yucatan, that after a series of disasters like drought, famine, civil war, disease and locusts, came hurricanes which tore up every big tree, ruined orchards and fields and blew away houses. Early traditions of Haiti, too, refer to floods and cataclysms.

Science News Letter, September 26, 1931



WHY WE HAVE SO MUCH MOONLIGHT

This diagram, which is described in the text, explaining abundant moonlight, shows how the harvest moon will shine for an unusually long time several days before and after Saturday, Sept. 26.

GEOLOGY

The Great Ice Age

"A Classic of Science"

Swiss Glaciers Taught Agassiz to Read Records of the Ice Cap that Once Covered Northern Europe and America

ETUDES SUR LES GLACIERS; par L. Agassiz. Neuchatel, Jent et Gassmann, 1840. Translated for the SCIENCE NEWS LETTER *by Helen M. Davis.*

SINCE it can be shown by comparative study of fossils and by our knowledge of conditions under which we find animals buried in ice in the North, that the so-called diluvian formation of the North is not only contemporaneous with, but identically the same as, the deposits of bones of the *Elephas primigenius* of central Europe, and since no doubt remains that the catastrophe which froze them was sudden and accompanied by an abrupt change in temperature, it seems to me evident that the animals whose fossil bones are buried in the diluvian soil perished by the same cause, that is to say, by the cold and that consequently they came to be buried in the ice. But since it has been shown that the ice containing the mammoths is older than the lifting of the Alps, because formations with the bones of *Elephas primigenius,* which are contemporaneous with ice which Kotzebue called primitive, were dislocated when the Alps rose, I conclude that there was once a sheet of ice over the soil of Europe, which prevented the complete dispersion of alluvial soil, the filling up of lakes, and all inequalities already existing or formed by the lifting of the Alps. The ice sheet must be understood to be older also than the scattered boulders. The nature and the origin of those boulders themselves become themselves a new proof of the fact, so long ignored, and now so well proved, that the Alps are the youngest mountains in Europe, because the boulders resulting from fractures which they have suffered are always found resting on top of the alluvial soil, and never beneath it.

The formation of this great ice sheet must have swept away as its consequence all organic life from the surface of the earth. The surface of Europe, ornamented only a short time before by a tropical vegetation and inhabited by troups of great elephants, enormous hippopotami and gigantic carnivora, suddenly was buried under a vast mantle of ice which covered alike the plains, the lakes, the seas and the plateaus. After the commotion of a powerful creation came the silence of the dead. The springs dried up, the rivers ceased flowing, and the rays of the sun, rising upon this shore of ice (if indeed they reached it), were greeted only by the whistling of the north wind and the booming of crevasses which opened at the surface of this vast ocean of ice.

Interior Boiled Up

But this state of things had an end, a reaction took place: the fluid masses of the earth's interior boiled up again with great intensity; their activity showed itself in the principal chain of the Alps, whose rocks were altered in many ways and elevated to their present heights, with the crust of ice which covered them; which was itself dislocated like an ordinary rock formation. Enormous falls of rocks detached themselves at that time from the crests which dominated the ice sheet, for example, from Mont Blanc, whose elevation was earlier than that of the eastern Alps, and folds were caused by the appearance of the principal chain of the Alps at the extremity of the mass of Mont Blanc and in all the central and eastern part of the chain. Once strewn on the surface of the mass of ice which filled the space comprised between the Alps and the Jura, this debris remained there as on the surface of a great glacier.

While the appearance of the chain of the Alps had suddenly modified the climatological conditions of Switzerland, the temperature rose again and the alternation of the seasons, making itself felt anew, must have caused continual oscillations of heat and cold there which were necessarily recorded in the ice at the time of the oscillations, as they are exhibited by glaciers in our time. The surface of the great ice sheet of Switzerland must first have taken on a slope conforming to the general inclination of the earth from the Alps to the Jura: if this was of névé, it would be transformed into ice by the alternating effects of freezing and thawing: later its level would be gradually lowered; then would begin that long series of phenomena of withdrawal, analogous to that which certain of our glaciers show: boulders carried on the surface of the glacier depositing themselves the length of the Jura at lower and lower levels, down to that where the soil is uncovered; then organized life commencing to reappear where local circumstances were favorable to their development.

So long as the great ice sheet which covered Europe remained motionless, it must have been covered with snow, like the fields of ice which feed our glaciers in our day; but in retiring into narrower limits, this same ice cap determined its centers of movement in conformity with the highest accidental topography. Thus the Swiss Alps must have been the center of phenomena of transportation of the scattered boulders which are strewn over the great Swiss plain, upon the Jura and in the north of Italy. The appearance of Switzerland at the time of autumnal fogs, when the Alps and the highest summits of the Jura alone rise above the snows, seems to me to give an approximate idea of conditions at the beginning of the retreat of the glaciers, when these had not reached farther than the level of the first ledge below the high peaks of the chain before the Jura.

The moraines properly speaking did not begin to form until the ice began to retire into the valleys. The form and the arrangement of these moraines

David Starr Jordan

friend of humanity, gives a biological argument for

PEACE

in next week's
CLASSIC OF SCIENCE

prove to us that this retreat of the ice, far from having been instantaneous, was on the contrary accomplished in a gentle and gradual manner; from which I conclude that the epoch of greatest extension of the ice must have lasted a long time.

The retreat of the ice into more and more narrow limits also began from centers of movement in chains where there are no glaciers in our day: this is shown by observations of MM. Renoir and Hogard on the polished rocks and moraines of the Vosges, and those which I have already reported concerning the Dent de Vaulion, which was a glacier surrounded wholly by Jurassic rocks, undoubtedly from a time when the alpine glaciers had attained no greater height than the slopes of the Jura.

The scattered boulders, which differ so markedly from the moraines in their general arrangement, cannot therefore be in any way confused with the latter; since they were strewn before the formation of the moraines, that is to say, while the ice still occupied the entire Swiss plain.

On the other hand, when we consider that all our scattered boulders are so many splinters broken off from the mass of the Alps since their elevation, and that consequently they must have been transported to the places they occupy after this uplift, we are naturally led to ask how it is that they did not fill up our lakes. There are only two possible causes: either the lakes were protected in some way from invasion by the boulders, or else they did not exist when this transportation took place. But we have already seen earlier that this last supposition is contradictory to the facts, since we have observed on both their banks moraines arranged like those of a glacier which undergoes oscillations. I believe in consequence that our lakes are due to the uplifting of the Alps, or at least to dislocations produced by that cataclysm.

The north of Europe is the center of another region of boulders, which are scattered over England, Germany, Poland and Russia, about which M. Pusch has published very interesting general observations. The polished rocks which accompany them have been described by M. Sefstroem.

The north of America, with its scattered boulders and its polished rocks present repetition of the same phenomena in that part of the world.

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MINING

Airplanes Enable Geologists To Survey Arctic Copper

FLYING in a few hours over sections of the Barren Grounds of the North West Territories of Canada, which could be crossed by dog team or canoe only in weeks or months, aerial prospectors have found valuable deposits of copper within the Arctic circle.

This discovery, a recent achievement of man's newest mode of travel in one of the world's most inaccessible and undeveloped regions, is described in reports to the Canadian Mining and Metallurgical Institute by J. P. Norris and Gordon G. Duncan, each a member of geological parties that made extensive surveys with both plane and canoe.

The territory in which the newly-found copper deposits were surveyed lies along the Coppermine River between Great Bear Lake, Canada's largest inland body of water, and Coronation Gulf on the Arctic Ocean—in a land that is practically barren of trees and where in the winter the temperature falls under 50 degrees below zero and in the summer rises to more than 90 degrees Fahrenheit.

Yet the geologists who visited this region believe that when the world demands it, copper can be satisfactorily sent from this distant land of contrasts, either across Great Bear Lake, down Great Bear River to the Mackenzie River and hence to the Arctic Ocean, or directly to the Arctic at Coronation Gulf. Some deepening of rapids would be necessary in the rivers, but no difficulty is expected by ocean-going vessels rounding Alaska and coming into the Arctic Ocean as far as Coronation Gulf, for this has been done in the summer for a number of years.

Some high-grade copper ore has been found, but during the short time the parties were in the field they could not determine how extensive the deposits are. If this ore is in sufficient quantity, it can be profitably moved, Mr. Duncan explained in his report.

"The exploitation of the lower-grade deposits," he said, "is dependent upon the opening up of the area by the successful development of the higher-grade ore. Undoubtedly, other important ore bodies will yet be found."

Although all the flying done by the survey parties was far inland, they never found it necessary to use airplanes on wheels. In fact, it would have been almost impossible to find a suitable landing place for wheels, while myriads of lakes and rivers provided the best of runways for pontoons in summer and skis in winter.

Science News Letter, September 26, 1931

ARCHAEOLOGY

Air Gun Used to Dust Delicate Artifacts

ARCHAEOLOGISTS have discovered a new use for compressed air. They use it when working at ancient Indian sites to blow the dust of centuries from fine, delicate specimens, such as fur robes, burned matting, or badly disintegrated wood or bone.

The apparatus which has been successfully used by the Van Bergen-Los Angeles Museum Expedition in its work at caves and old village sites is simple. It consists of a small, portable air tank ordinarily used in spraying vineyards and orchards. The tank has a trigger-controlled nozzle through which air, instead of the spraying compound, is directed upon archaeological material too delicate to stand the touch of hands or even a fine camel's-hair brush.

In deposits such as debris of the old Basket Maker Indians, in which perishable materials are found, the air tank and hose with its readily controlled nozzle are most useful. Often, the fine dust of the centuries which has settled upon the artifacts left by these people who died some 1500 to 2000 years ago is soft and fluffy as ashes. Trenching is difficult. Even such tools as the ever-present and easily wielded trowel, the main digging tool of every well-trained archaeologist, prove too heavy.

When such difficulties are met the air gun is brought into play. Steady, gentle air currents are directed at the layers of dust, chaff, light straw and such debris, whisking them to one side, quickly and evenly, leaving the specimen or specimens bare, ready for photographing and, if necessary, treatment for future preservation.

Science News Letter, September 26, 1931

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BELIEVED HIM TO BE NIMROD

This picture is reproduced from Layard's *Nineveh (1849)* in Classic of Science, SNL No. 529, in which the first archaeologist to find the site of Nineveh and explore its wonders describes the discovery of a gigantic statue in the temple gateway.

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BOTANY

New Oil for Paints Promised by Safflower

SAFFLOWER, *Carthamus tinctorius L.*, which in its photographs looks to the layman something like a thistle without prickles, is one of the new plants being developed experimentally by the Department of Agriculture for its oil-bearing seeds.

The seeds contain a drying oil valuable in the production of paints and varnishes and allied products. The oil cake is useful as a stock feed.

The plant is not really new, excepting in this country. For years it has been cultivated in India and Egypt as an oil-seed crop.

Frank Rabak of the Bureau of Plant Industry, U. S. Department of Agriculture, under whose supervision experimental plantings of safflower have been grown, states that the crop is especially well adapted to the northern Great Plains region.

In this section of the country too much wheat is grown, the Federal Farm Board believes, while figures show that the United States is actually importing flaxseed for the linseed oil which it contains. In 1929 this country produced only forty per cent. of its linseed oil.

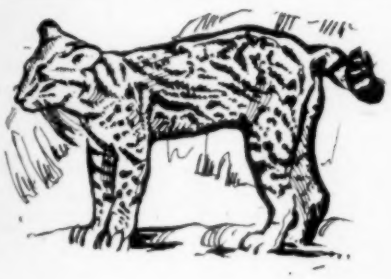
Safflower is suggested as a supplementary crop to flax for the Northwest. The same farm machinery for sowing and harvesting it can be used as is now employed for other small grain crops. The safflower plant grows well in sandy or clay loam soil, and it appears to be more resistant to frost than flax.

Mr. Rabak emphasizes, however, that while safflower apparently gives promise as a drying oil seed crop, commercial growing of the crop is not yet recommended.

ZOOLOGY

Nature Ramblings

By FRANK THONE



An American Leopard

IT WOULD STARTLE the average sportsman to run into an animal that looks like a leopard running loose on American soil, and he might well be justified in thinking he had encountered an escape from some circus menagerie. But there is a leopard-spotted cat that occasionally gets into United States territory, though its real home is much farther south, and its incursions into Texas must be regarded as the extreme northern fringe of its distribution. Nevertheless it is seen there often enough to claim inclusion in standard lists of the fauna of the United States.

The ocelot is not a leopard, of course. True leopards are Old World animals. But it is a big cat with leopard-like spots, and that is enough for all practical purposes. It does not run so large as the jaguar, though a total length of 50 inches, head to tail, and a weight of 35 pounds entitle it to plenty of respect. The jaguar, by the way, also comes up into this country from Mexico, and is occasionally seen by ranchers and hunters in Texas, New Mexico and Arizona.

Like most of the cat tribe, the ocelot sleeps all day and prowls all night, seeking what it may devour. It climbs trees as easily as its domestic counterpart, and is as fond of birds—including domestic poultry. Rabbits and other wild rodents, snakes and other reptiles, all go to make up its diet. Except for its occasional raids on the chicken-pen it should be counted an inoffensive animal, and possibly, in view of the overgrazing of range lands by rabbits, even a beneficial one.

Science News Letter, September 26, 1931

Some African natives believe that the souls of dead chieftains may visit their relatives in the form of snakes.

PUBLIC HEALTH

Disappearance of Diphtheria In Few Years Predicted

Latest Preventives Are so Efficient that Death Now Declared Result of Ignorance or Neglect

"A DEATH from diphtheria must be considered as a result of ignorance or neglect," Dr. W. T. Harrison, of the National Institute of Health, declared at the symposium on toxoid immunization, latest method of diphtheria prevention, during the recent meeting of the American Public Health Association, in Montreal.

Two methods of preventing diphtheria deaths now exist—one is early treatment of the disease with antitoxin; the other is prevention by immunization with toxoid, successor to toxin-antitoxin, Dr. Harrison explained.

The prevention of diphtheria by active immunization is the greatest thing in public health since Jenner's development of vaccination against smallpox," Dr. Harrison said.

He predicted that diphtheria, once the dreaded scourge of childhood, will disappear in a few more years.

Credit for the development of immunization against diphtheria goes to Dr. William H. Park, director of laboratories of the New York City Health Department, although toxoid was first introduced by Prof. G. Ramon of the Pasteur Institute in Paris.

"Dr. Park has done more than any living man to wipe out diphtheria," Dr. Harrison said. He developed toxin-antitoxin, and it is his influence on health departments, parents and physicians that has enormously reduced the diphtheria death rates in many American cities.

The diphtheria bacillus produces a poison or toxin which, in massive amounts, causes illness and death. Antitoxin is an antidote to the diphtheria poison and is used to treat cases of the disease. Toxin-antitoxin, on the other hand, is toxin largely neutralized by antitoxin. When it is introduced into the body, the antitoxin gradually splits off, leaving more and more of the toxin. These very small doses of toxin have the effect of raising the body's resistance to the disease.

Toxin-antitoxin has the disadvantage that when it has been frozen for a time it may become inert, or, on the other hand, may become toxic. This uncertainty is entirely absent in toxoid. Toxoid is toxin to which a small amount of the common disinfectant formalin has been added, and which is then kept at a temperature of 100 to 102 degrees Fahrenheit for from three to six weeks. During this time it loses all its toxicity, but retains its immunizing properties.

Toxoid is entirely non-poisonous and absolutely harmless, Dr. Harrison emphasized. No case of injury has been known to follow its use. Neither is there any danger of serum sickness, as it contains no horse or other serum. It is given in courses of two or three treatments. After the first course, nine-tenths of the children become completly immune. Toxoid is twenty to thirty per cent. more efficient, even when only two doses are given, than is toxin-antitoxin, experiments have shown.

Toxoid plus alum gives the best results, Dr. Park and his associate, Dr. May C. Schroeder, reported. Toxoid should be used for pre-school children. In a few older children and adults, toxoid causes a marked local reaction.

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Science Leaves Nothing Solid

(Continued from page 199)

"Our microscopic concepts may not fit this ultra-microscopic world of the quantum. And our best hopes for the future are founded on the working out of a new system of concepts and laws suited to this new world that has swum into the ken of science. The rapid development of wave mechanics in the last four years seems to have brought us within sight of this ideal, and we are beginning to discern a new kind of order in the microscopic elements of the world, very different from any type of law hitherto imagined in science, but none the less a rational order capable of mathematical formulation . . . The complete recasting of many of our categories of experience and thought may ultimately be involved."

Science News Letter, September 26, 1931

• First Glances at New Books

General Science

AN OUTLINE OF THE UNIVERSE—J. G. Crowther—*Dodd, Mead,* 376 p., $3.50. The Universe is a rather large order to crowd into less than 400 ordinary book pages; yet the author succeeds at least in sketching the major outlines in satisfactory fashion. Approximately the first half of the book is given over to cosmology and the physical sciences; these pass *via* organic chemistry into the life sciences; and the latter conclude with a brief section on the development of civilization.

Science News Letter, September 26, 1931

General Science

READINGS IN SCIENCE — Edited by George W. Hunter and Robert C. Whitford—*Macmillan,* 283 p., 60c. An assortment of compellingly-written chapters in various fields of science, from the writings of men who both knew and could tell what they knew. There are two contributions each from Darwin, Huxley and Slosson; one each from Newcomb, Smalley, Vallery-Radot, Stefansson, Thomson, James, Shipley, Beebe, Muir, Sharp, Thoreau and Gilbert White. Designed for school use, this series is sure to overleap this corral and travel about in the pockets (it admirably fits a pocket) of a great many persons who are through with school but not through with learning.

Science News Letter, September 26, 1931

Archaeology

REPORT ON EXCAVATIONS AT JEMDET NASR, IRAQ—Ernest Mackay—*Field Museum,* 84 p., 18 pl., $2. Painted pottery and other objects dug up at this site near ancient Kish by the Field Musem-Oxford University Joint Expedition of 1925-1926 are described in this report. A preface by Prof. Langdon tells briefly of the two weeks' excavations at Jemdet Nasr in 1928, which have added new information, somewhat modifying Mr. Mackay's conclusions as to the age of the pottery and the identity of the people who occupied the site.

Science News Letter, September 26, 1931

General Science

DOCTORATES CONFERRED IN THE SCIENCES BY AMERICAN UNIVERSITIES, 1930-1931—Compiled by Callie Hull and Clarence J. West—*National Research Council,* 55 p., 50c. This, the twelfth annual compilation of the kind which the Research Information Service of the National Research Council has made, shows how the number of doctorates granted by American universities has grown from 330 in 1919-1920 to 1,147 in 1930-1931.

Science News Letter, September 26, 1931

Forestry

TROPICAL FORESTS OF THE CARIBBEAN—Tom Gill—*Tropical Plant Research Foundation,* 318 p., $5. The forests of the East are about gone, those of the South are badly depleted, those of the Pacific Northwest will some day follow. What then? Reforestation of our domestic woodland areas does not promise replacement fast enough to meet the increasing appetite of Americans for wood. There remain the tropics, with their millions of acres of virgin timber, and the most accessible, both geographically and economically, are those of the Caribbean region. Mr. Gill performs a distinct service to both lumberman and forest conservationist in this pioneer book on the next new frontier of forests.

Science News Letter, September 26, 1931

Physics

TELEVISION: ITS METHODS AND USES—Edgar H. Felix—*McGraw-Hill,* 272 p., $2.50. Television, younger sister of radio, seems to hover perpetually on the threshold but never quite "comes out." In this book Mr. Felix, who knows radio, tells of strivings and achievements in television up to the present; tells also of difficulties and problems, both scientific and economic, that must be overcome; takes a glimpse into the probable future.

Science News Letter, September 26, 1931

Ornithology-Anthropology

THE DOMESTICATION OF THE CORMORANT IN CHINA AND JAPAN—Berthold Laufer—*Field Museum,* 59 p., 3 pl., 75c. A brief account, going back into the remotest available historical records, of the interesting Oriental art of cormorant-fishing.

Science News Letter, September 26, 1931

Engineering

INTERNAL-COMBUSTION ENGINES—Howard E. Degler—*American Technical Society,* 159 p., $2. An elementary, practical treatise, well illustrated with both diagrammatic sketches and photographs of actual engines. Considerable attention is given the Diesel engine both as a prime mover for small power plants and as an aircraft motor.

Science News Letter, September 26, 1931

Biology

LIFE: OUTLINES OF GENERAL BIOLOGY—J. Arthur Thomson and Patrick Geddes—*Harpers,* 1515 p. (2 vols.), $15. Here is the comprehensive outline of the science of life for which we really have been waiting. The names of the authors command not merely popular interest but also profound respect among their fellow-biologists; their account is carefully and readably written, it is complete, it is up to date; anything flashy or slipshod simply could not come from Thomson and Geddes. It is not pretended that these crowded volumes are for indolent or immature readers; yet one need not bring to them anything more than alertness and intelligence, and a willingness to pay attention. You need not be a biologist to enter this book, but if you go through it (not too rapidly) you can be a pretty good one when you come out.

Science News Letter, September 26, 1931

Entomology

WONDERS OF THE ANT WORLD—Hans Heinz Ewers—*Dodd, Mead,* 233 p., $2.50. A second edition of an interesting popular book on what are perhaps the most interesting of all insects, this time edited with special thought for its use by young readers.

Science News Letter, September 26, 1931

Economic Botany

IMPORTANT WESTERN BROWSE PLANTS—William A. Dayton—*Government Printing Office,* 214 p., 45c. A well-illustrated brochure of interest alike to practical stockman, range-land administrator and professional botanist. Even the casual tourist through the West would do well to send to Washington for a copy, for it will tell him interesting things about a lot of the bushes among which he camps.

Science News Letter, September 26, 1931

Medical Economics

PAYING YOUR SICKNESS BILLS—Michael M. Davis—*University of Chicago Press,* 276 p., $2.50. All aspects of this universally interesting subject are discussed in a sane and unbiased way. The author is a physician who understands the patient's viewpoint thoroughly and who is also versed in economics. Distribution of sickness costs through group insurance is his suggestion for solving the individual's problem of paying for adequate medical care.

Science News Letter, September 26, 1931